

A preliminary prospective study of an escalation in ‘maximum daily drinks’, fronto-parietal circuitry and impulsivity-related domains in young-adult drinkers

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Supplementary Material

Principal Component Analysis of Composite impulsivity-related domains (CIRD)

Participants included in the PCA analysis (N=440) were 18.3 (SD=0.7) years of age and 59% were female. Approximately 80% reported some lifetime drinking, with an average 9.0 (SD=7.6) lifetime maximum number of drinks on a single occasion (ranging from 1 to 35). Participants were assessed with multiple self-report questionnaires; the Zuckerman Sensation Seeking Scales (ZSSS) (Zuckerman and Neeb, 1979), Behavioral Activation/Inhibition System (BAS/BIS) (Carver and White, 1994), Barratt Impulsiveness Scale (BIS-11) (Patton *et al*, 1995), sensitivity to reward and sensitivity to punishment (SPSRQ) (Torrubia *et al*, 2001), Padua Inventory (PI) (Sternberger and Burns, 1990) and computerized tasks comprising the (Classic Balloon Analog Risk Task (BART) (Hunt *et al*, 2005), JAVA Neuropsychological Test (JANET) version of the BART (Cherkil *et al*, 2012) and the Experiential Discounting Task (EDT) (Reynolds and Schiffbauer, 2004).

To assess the multidimensional impulsivity-related traits from these measures, factor analysis with principal components extraction method followed by varimax rotation was conducted using various sub-measures that included (i) thrill- and adventure- seeking (ZTAS), experience seeking (ZES), disinhibition (ZDIS) and boredom susceptibility (ZBS) sub-scales of ZSSS, (ii) drive, fun, reward sub-scales of BAS and BIS, (iii) attentional, motor and non-planning impulsivity sub-scales of BIS-11, (iv) sensitivity to reward and sensitivity to punishment sub-scales of SPSRQ (v) total score of Padua Inventory (PI), (vi) overall average adjusted pumps of the conventional BART, (vii) total pumps and total pops of the JANET BART and (viii) total area under the curve (AUC) from the EDT. Factor loadings ≥ 0.5 (Table S1) were chosen as cut-off for an impulsivity measure to load on its respective factors.

Table S1. Composite impulsivity-related domain (CIRD) factor structure

Variable/scale	CIRD1 Impulsive action	CIRD2 Approach/ appetite motivation	CIRD3 Impulsivity/ compulsivity	CIRD4 Experience and thrill seeking	CIRD5 Risky choice	CIRD6 Impulsive choice
BIS-11 Non planning	0.82	-0.03	-0.01	-0.01	0.01	-0.09
BIS-11 Attentional	0.77	0.08	0.1	-0.01	-0.08	-0.13
BIS-11 Motor	0.71	0.25	0.02	0.2	0.1	-0.01
ZSSS Boredom	0.54	-0.05	0.02	0.32	0.03	0.2
ZSSS Disinhibition	0.52	0.26	-0.01	0.35	0.05	0.2
BAS Reward	-0.07	0.86	0.01	-0.17	-0.03	0.007
BAS Drive	0.2	0.72	0.07	0.12	0.005	0.03
BAS Fun	0.4	0.58	-0.02	0.39	0.04	-0.05
SPSRQ Punishment	-0.03	-0.04	0.83	-0.2	-0.09	-0.06
Padua Total score	0.1	-0.05	0.77	-0.09	-0.01	-0.06
SPSRQ Reward	0.05	0.2	0.73	0.2	-0.006	0.04
ZSSS Thrill- and adventure seeking	0.01	0.2	-0.02	0.74	0.07	-0.15
ZSSS Experience seeking	0.29	0.005	0.05	0.64	-0.03	0.09
BIS	-0.1	0.3	0.24	-0.59	-0.08	-0.02
JANET BART Total pops	0.001	0.05	-0.03	0.04	0.85	-0.009
JANET BART Total pumps	0.1	0.005	-0.07	-0.09	0.79	-0.14
Classic BART Adjusted pumps	-0.05	-0.07	-0.003	0.15	0.51	0.23
EDT AUC	-0.03	0.03	-0.08	-0.04	0.02	0.9

Abbreviations: BIS-11, Baratt Impulsiveness Scale; ZSSS, Zuckerman Sensation Seeking Scales; BAS, Behavioral Activation System ; SPSRQ, Sensitivity to Reward and Sensitivity to Punishment Questionnaires; BIS, Behavioral Inhibition System; JANET: Java Neuropsychological Test; BART, Balloon Analog Risk Task; EDT, Experiential Discounting Task; AUC: area under the curve.

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